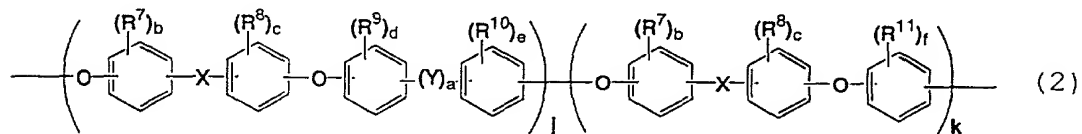
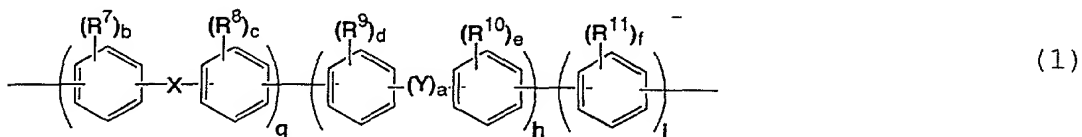


WHAT IS CLAIMED IS:

1. A chemical mechanical polishing stopper film comprising at least one organic polymer, said film having a dielectric constant of 4 or lower.

2. The chemical mechanical polishing stopper film as claimed in claim 1, wherein said organic polymer is at least one member selected from the group consisting of aromatic polyarylenes and aromatic poly(arylene ether)s.

3. The chemical mechanical polishing stopper film as claimed in claim 1, wherein said organic polymer is at least one member selected from the group consisting of polymers having repeating structural units represented by the following general formulae (1) and (2):



wherein R^7 to R^{11} each independently represent a hydrocarbon group having 1 to 20 carbon atoms, a cyano group, a nitro group, an alkoxy group having 1 to 20 carbon atoms, an aryl group, or a halogen atom; X is at least one member selected from the group consisting of groups represented by $-\text{CQQ}'-$ (wherein Q and Q' may be the same or different and each represent a halogenoalkyl group, an alkyl group, a hydrogen atom, a

halogen atom, or an aryl group) and a fluorenylene group; Y is at least one member selected from the group consisting of -O-, -CO-, -COO-, -CONH-, -S-, -SO₂-, and a phenylene group; a is 0 or 1; b to f each are an integer of 0 to 4; g is 5 to 100 mol%; h is 0 to 95 mol%; i is 0 to 95 mol% (provided that g+h+i = 100 mol%); j is 0 to 100 mol%; and k is 0 to 100 mol% (provided that j+k = 100 mol%).

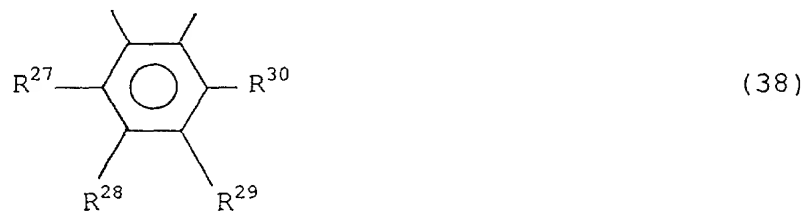
4. The chemical mechanical polishing stopper film as claimed in claim 1, wherein said organic polymer has a structure represented by the following general formula (36).



wherein Y₁ represents a bivalent organic group represented by the following formula (37) or (38); Ar represents a bivalent organic group; and n represents 0 or 1;



wherein R²⁵ and R²⁶ may be the same or different, are located in the cis positions, and each represents a hydrogen atom, an alkyl group, or an aryl group;



wherein R²⁷ to R³⁰ may be the same or different and each represents a hydrogen atom, a fluorine atom, an alkyl group, a halogenated alkyl group or an aryl group.

5. A process for producing a chemical mechanical

polishing stopper film, which comprises applying a coating fluid comprising at least one organic polymer (A) and an organic solvent (B) to a substrate and heating the coating.

6. A chemical mechanical polishing method which comprises forming a chemical mechanical polishing stopper film comprising at least one organic polymer on an insulating film so that the stopper film is interposed between the insulating film and a metal film to be removed by chemical mechanical polishing, and then removing the metal film with a polishing fluid.

7. The chemical mechanical polishing method as claimed in claim 6, wherein said metal film is composed of a first metal film comprising a barrier metal and, formed thereon, a second metal film comprising copper, an alloy containing copper as the main component, or a copper compound.

8. The chemical mechanical polishing method as claimed in claim 6, wherein said chemical mechanical polishing stopper film comprises at least one member selected from the group consisting of polyarylenes and poly(arylene ether)s.

9. A polishing method which comprises: forming on a semiconductor region a two-layer film which has an opening and is composed of an insulating film and a chemical mechanical polishing stopper film disposed on the insulating film; depositing a first metal film comprising a barrier metal and a second metal film comprising copper, an alloy containing copper as the main component, or a copper compound on the chemical mechanical polishing stopper film and in the opening

to thereby fill up the opening with the deposited metal films;
and removing the second metal film present over the chemical
mechanical polishing stopper film with a chemical mechanical
polishing fluid.